

EM-RFO--KHLL-NONPUOPS1-2002-0003 FINAL

Non-Plutonium Operations Area I
(Name of Facility)

Balance-of-Plant
(Facility Function)

Rocky Flats Env. Technology Site Kaiser-Hill Company, L.L.C.
(Site) (Contractor)

Name: Jerry Anderson
Title: Facility Manager **Telephone No.:** (303) 966-6438
(Facility Manager/Designee)

Name: POPPELL, FRANK S
Title: RISS ESH AND Q OSE **Telephone No.:** (303) 966-6209
(Originator/Transmitter)

Name: S.L. Cunningham **Date:** 10/09/2002
(Authorized Classifier (AC))

1. Occurrence Report Number: EM-RFO--KHLL-NONPUOPS1-2002-0003

Building 865 Rigging Incident

2. Report Type and Date: FINAL

Date Time
Notification: 09/03/2002 16:26 (MTZ)
Initial Update: 10/14/2002 14:05 (MTZ)
Latest Update: 10/14/2002 14:05 (MTZ)
Final: 10/24/2002 16:29 (MTZ)

3. Occurrence Category: Off-Normal

4. Number of Occurrences: 1 **Original OR:**

5. Division or Project: Kaiser-Hill Company, L.L.C.

6. Secretarial Office: EM - Environmental Management

7. System, Bldg., or Equipment: Building 865

8. UCNI?: No

9. Plant Area: RISS

10. Date and Time Discovered: 08/30/2002 12:30 (MTZ)

11. Date and Time Categorized: 08/30/2002 13:50 (MTZ)

12. DOE HQ OC Notification:

Date	Time	Person Notified	Organization
NA	NA	NA	NA

13. Other Notifications:

Date	Time	Person Notified	Organization
08/30/2002	13:51 (MTZ)	Deanna McCranie	DOE/RFFO

14. Subject or Title of Occurrence:

Building 865 Rigging Incident

15. Nature of Occurrence:

03) Personnel Safety
C. Safety Concerns

16. Description of Occurrence:

On August 30, 2002, a subcontractor performing equipment movement activities rigged and lifted a large piece of the base of a Cincinnati Hydros핀 lathe in Building 865, Room 145. The load was suspended off its base when both lifting straps broke causing the load to fall. No personnel injuries occurred and no equipment or structural damage was evident.

Subcontractor personnel were conducting a test pick of a section of the Hydros핀 lathe base with an electric 10-ton overhead crane and two synthetic fiber slings. The section of the Hydros핀 that was being lifted was estimated to weigh approximately 15,000 lbs. The synthetic slings were arranged in a basket hitch configuration and made a 4-point attachment to the crane hook. Markings on the slings showed the maximum load capacity for this configuration was 18,600 lbs. per sling, for a combined capacity of 37,200 lbs. Considering the angle of the pick, this sling capacity was reduced. Prior to attempting the pick, the subcontractor personnel inspected the rigging equipment and determined the slings and crane had an adequate lifting capacity for the pick. The Hydros핀 section had been moved from its original location and blocked with steel I-beam cribbing. The subcontractor personnel inspected the bottom, sides, and other parts of the Hydros핀 that could contact the slings. They observed a metal ridge

approximately 6 inches above the bottom edge of the Hydrosin on one side and determined that this ridge could potentially cut into the slings. They decided to protect the slings using leather work gloves for softening. The crew proceeded to place the softening and arrange the rigging for the pick. All personnel were removed from the immediate area and stood back at a safe distance. The crane was activated using an electric remote control and the Hydrosin was raised a few inches off of the cribbing. After a brief period, both slings failed causing the Hydrosin to fall. One end of the Hydrosin remained on the cribbing while the other end rested on the floor. The subcontractor personnel were concerned that the Hydrosin was now unstable and created a safety hazard, thus they decided to place it back onto the cribbing. They replaced the damaged fabric slings with wire rope slings and used additional softening to protect the wire rope. They re-rigged the equipment, lifted the Hydrosin and replaced the cribbing.

17. Operating Conditions of Facility at Time of Occurrence:

Not Applicable - Equipment Removal in Process

18. Activity Category:

11 - Facility Decontamination/Decommissioning

19. Immediate Actions Taken and Results:

Equipment was stabilized and placed in a safe condition. All hoisting and rigging activities were suspended and the involved lifting crane was placed out of service until it could be inspected. A fact finding meeting was scheduled.

20. Direct Cause:

- 1) Equipment/Material Problem
 - A. Defective or Failed Part

21. Contributing Cause(s):

- 3) Personnel Error
 - A. Inattention to Detail

22. Root Cause:

- 3) Personnel Error
 - B. Procedure Not Used or Used Incorrectly

23. Description of Cause:

The direct cause of this event was determined to be the failure of the lifting straps due to inadequate protection of the rigging from contact with the ridge near the bottom edge of the Hydrospro and exceeding the capacity of the slings. The softener used to protect the synthetic slings and the slings were cut cleanly in two, as if by a sharp knife.

The contributing cause was determined to be inattention to detail when calculating the weight of the Hydrospro. Prior to the incident, an engineer estimated the weight to be approximately 15,000 lbs; however, it is unclear how this was determined since there was no documented engineering review. An engineering review of the Hydrospro after the incident calculated the weight to be more than 26,000 lbs., exceeding the capacity of the crane.

The root cause was determined to be a personnel error due to failure to follow procedures. Subcontractor personnel did not comply with procedural requirements for a critical lift as required by Environmental Chemical Corporation's (ECC) procedure, SOP HS-023, "Hoisting/Rigging and Crane Operations Program". A Critical Lift Plan was not developed for the lift. Had this procedure been followed and the required documents properly prepared, reviewed and approved, the weight of the load would have been more accurately calculated and proper hoisting and rigging equipment and techniques would have been utilized.

24. Evaluation (by Facility Manager/Designee):

This occurrence did not have any adverse affects on other site or any Building 865 safety systems. Upon the discovery of this event, Kaiser-Hill (KH) management appropriately responded to stop work on all ECC hoisting operations immediately. The Stop Work Order extended to cranes, hoists, chainfalls, come-alongs, and rope/pulley apparatus. These types of evolutions were suspended until KH and ECC evaluated the event, implemented corrective actions and rescinded the order. One particular concern is that the subcontractor did not immediately stop all work activities when the slings broke, but instead lifted the load again exceeding the crane capacity twice. Appropriate corrective actions have been taken to ensure ECC understands and complies with KH and DOE expectations regarding this issue.

25. Is Further Evaluation Required?: No

26. Corrective Actions (* = Date added/revised since final report was approved.)

1. Issue Stop Work for all ECC hoisting and rigging activities.

Responsibility: J.R. Marschall

Target Completion Date: 09/05/2002 **Completion Date:** 09/05/2002

2. Tag out crane until re-certification is complete.
Responsibility: Jerry Anderson
Target Completion Date: 08/30/2002 **Completion Date:** 08/30/2002
3. Re-inspect crane to determine if it was overstressed and re-certify.
Responsibility: Keith Pushaw
Target Completion Date: 09/16/2002 **Completion Date:** 09/16/2002
4. Revise lift checklist and JHA to incorporate enhancements provided by KH.
Responsibility: Keith Pushaw
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
5. Perform briefing of all ECC personnel to JHA requirements regarding rigging.
Responsibility: Keith Pushaw
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
6. Inspect any similar loads for edges or ridges like the one that contributed to the problem with this lift. Take steps to mitigate any found on future lifts. This includes evaluating the use of commercial or engineered softeners. This step should be inserted as requirement in the JHA.
Responsibility: Keith Pushaw
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
7. KH will assign a SME to review/oversee critical lifts.
Responsibility: Duke Snyder
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
8. KH will provide safety oversight of ordinary lifts and will review/concur on any lifts determined by ECC to be ordinary lifts.
Responsibility: Duke Snyder
Target Completion Date: 10/07/2002 **Completion Date:** 10/07/2002
9. KH safety oversight will observe Rope & Pulley activities for safe practices.
Responsibility: Duke Snyder
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
10. Provide senior KH mentoring of ECC floor supervision.
Responsibility: Duke Snyder
Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002
11. Investigate availability of talented supervisors in RFCSS and reassign to ECC, as necessary.

Responsibility: Karl Shuler

Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002

12. Recalculate hydrospin base weight.

Responsibility: Keith Pushaw

Target Completion Date: 09/04/2002 **Completion Date:** 09/04/2002

13. Evaluate ECC's calculations made for this load prior to attempting any additional lifting.

Responsibility: Tim Humiston

Target Completion Date: 09/11/2002 **Completion Date:** 09/11/2002

14. Evaluate the use of slings/ropes with the electric hoist.

Responsibility: Keith Anderson

Target Completion Date: 09/16/2002 **Completion Date:** 09/16/2002

15. Purchase a load cell to assist in weight calculations/hoisting operations.

Responsibility: Keith Pushaw

Target Completion Date: 09/16/2002 **Completion Date:** 09/16/2002

16. Brief the project on expectations for actions to be taken in the event of abnormal events.

Responsibility: JR Marschall

Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002

17. Revise the ECC critical lift checklist to incorporate softener evaluation, attaching weight calculation to the checklist and adding a KH RISS SME signature.

Responsibility: Keith Pushaw

Target Completion Date: 09/11/2002 **Completion Date:** 09/11/2002

18. Discipline supervisors involved in this incident.

Responsibility: Keith Pushaw

Target Completion Date: 09/04/2002 **Completion Date:** 09/04/2002

19. Hire additional engineering/technical support to assist in load calculations and determination of lift classification (Ordinary vs. Critical). Ensure definition of Critical Lift is clear. KH will concur on definition.

Responsibility: Keith Pushaw

Target Completion Date: 09/04/2002 **Completion Date:** 09/04/2002

20. Assign additional supervisory talent with hoisting/rigging expertise.

Responsibility: Keith Pushaw

Target Completion Date: 09/09/2002 **Completion Date:** 09/09/2002

21. Perform internal review of event by ECC Corporate VP for Operations.

Responsibility: Keith Pushaw

Target Completion Date: 09/06/2002 **Completion Date:** 09/06/2002

22. Reassign Project Manager to supervise floor activities.

Responsibility: Keith Pushaw

Target Completion Date: 09/04/2002 **Completion Date:** 09/04/2002

23. Conduct Senior Corporate Management Review with KH.

Responsibility: Keith Pushaw

Target Completion Date: 10/03/2002 **Completion Date:** 10/03/2002

24. Establish POD process that includes authorized work, change control rigor, and KH Project Manager concurrence.

Responsibility: Keith Pushaw

Target Completion Date: 09/06/2002 **Completion Date:** 09/06/2002

27. Impact on Environment, Safety and Health:

There is no impact on the health and safety of the workers, the public, the environment, quality or security as a result of this occurrence.

28. Programmatic Impact:

All hoisting operations in Building 865 were suspended by a Stop Work Order until KH and ECC evaluated the event and implemented corrective actions.

29. Impact on Codes and Standards:

There is no impact to codes and standards as a result of this occurrence.

30. Lessons Learned:

Hoisting and rigging operations that require exceptional care in handling, because of contents, size, weight, center of gravity, close-tolerance installation, high susceptibility to damage, or other unusual factors are considered critical lifts. One example is a large piece of equipment (i.e., milling machines, lathes, shears, drill presses, etc.) that could create a significant risk to people, property, or the environment, as was the case in this event. Prior to conducting the lift, adequate safety measures must be met, including the completion of the subcontractor's Critical Lift Plan. The weight of the load must be determined or conservatively estimated and proper hoisting and rigging equipment must be utilized to ensure the rated capacity will not be exceeded. During critical lifting operations safety needs to be the number one priority. Hoisting and rigging operations should

always be approached with extreme caution and when the unexpected happens, stop work and re-evaluate the steps needed.

31. Similar Occurrence Report Numbers:

RFO--KHLL-771OPS-2001-0025 RFO--KHLL-771OPS-2000-0037 RL--BHI-REMACT-2002-0007 OAK--SU-SLAC-2002-0007 ID--BNFL-AMWTF-2002-0005 CH-BH-BNL-BNL-2001-0023

32. User-defined Field #1:

020387 ISM=GP3-CF4

33. User-defined Field #2:

34. HQ Keyword(s):

01A--Conduct of Operations - Conduct of Operations (Misc.) 08N--OSHA/Industrial Hygiene Issues - Near Miss Other (Start Feb 99) 12K--EH Categories - Near Miss (Could have been a serious injury or fatality) 13F--Management Concerns - Operating Experience Summary Article

35. HQ Summary:

36. DOE Facility Representative Input:

For clarification, in section 23, the weight determination was initially done by the job supervisor vs the project engineer. Additionally, the crane that was used is rated for 20,000 pounds.

Entered by: MCCRANIE, DEANNA C Date: 10/24/2002

37. DOE Program Manager Input:

38. Approvals:

Approved by: Jerry Anderson, Facility Manager/Designee
Date: 10/14/2002
Telephone No.: (303) 966-6438

Approved by: MCCRANIE, DEANNA C, Facility Representative/Designee
Date: 10/24/2002
Telephone No.:

Approved by:
Manager/Designee
Date: 10/24/2002
Telephone No.:

Approval delegated to FR, Program